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service of any connection request in a nonblocking way on the condition that the connection request is compliant to certain constraints, the method for each of the circular-unimodal nonblocking switches includes: (a) configuring a switch defined by a set of connection states and having an array of N input ports with N distinct input addresses $0, 1, \dots, N-1$ and an array of N output ports with N distinct output addresses $0, 1, \dots, N-1$, the switch accommodating every complete matching between all N input addresses and all N output addresses by one of its connection states on the condition that, under the matching, the output addresses are a circular unimodal function of the input addresses, where a complete matching between all N input addresses and all N output addresses is equivalent to a combination of N concurrent point-to-point connections from the N input addresses to the N output addresses, and wherein said constraints on the connection request are that: there exists a combination of N concurrent point-to-point connections corresponding to a complete matching accommodated by the switch such that each of the incoming signals in the connection request arriving at a distinct one of the input ports and destined for a distinct one of the output ports determines a point-to-point connection which coincides with one of the point-to-point connections of said combination of N concurrent point-to-point connections accommodated by the switch; and (b) routing the incoming signals from their respective input ports to the corresponding output ports by activating one of the connection states such that the activated one of the connection states accommodates the connection request subject to said constraints on the connection request.

In accordance with a broad system aspect of the present invention, a class

of $N \times N$ circular-unimodal nonblocking switches each serving a connection request to route a plurality of incoming signals, and for enabling the service of any connection request in a nonblocking way on the condition that the connection request is compliant to certain constraints, each of the circular-unimodal nonblocking switches includes: (a) a switch defined by a set of connection states and having an array of N input ports with N distinct input addresses $0, 1, \dots, N-1$ and an array of N output ports with N distinct output addresses $0, 1, \dots, N-1$, the switch accommodating every complete matching between all N input addresses and all N output addresses by one of its connection states on the condition that, under the matching, the output addresses are a circular unimodal function of the input addresses, where a complete matching between all N input addresses and all N output addresses is equivalent to a combination of N concurrent point-to-point connections from the N input addresses to the N output addresses, and wherein said constraints on the connection request are that: there exists a combination of N concurrent point-to-point connections corresponding to a complete matching accommodated by the switch such that each of the incoming signals in the connection request arriving at a distinct one of the input ports and destined for a distinct one of the output ports determines a point-to-point connection which coincides with one of the point-to-point connections of said combination of N concurrent point-to-point connections accommodated by the switch; and (b) control circuitry, coupled to the switch, for routing the incoming signals from their respective input ports to the corresponding output ports by activating one of the connection states such that the activated one of the connection states accommodates the connection request subject to said constraints on the connection request.